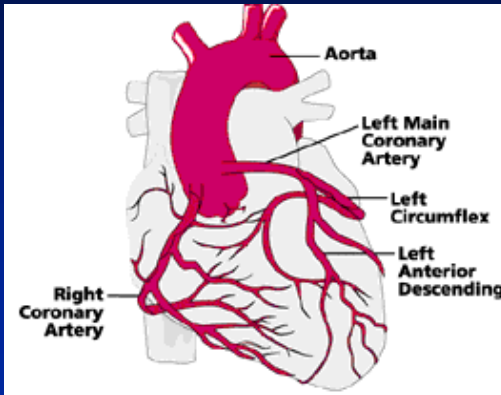


Essentials of 12 Lead ECG Interpretation

Topics

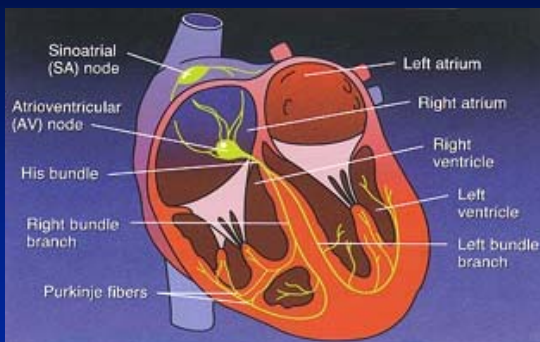
- Anatomy Revisited
- The 12 Lead ECG Device
- The 12 Lead ECG Format
- Waveform Components
- Lead Views

Anatomy Revisited



- RCA
 - right ventricle
 - inferior wall of LV
 - posterior wall of LV (75%)
 - SA Node (60%)
 - AV Node (>80%)
- LCA
 - septal wall of LV
 - anterior wall of LV
 - lateral wall of LV
 - posterior wall of LV (10%)

Anatomy Revisited

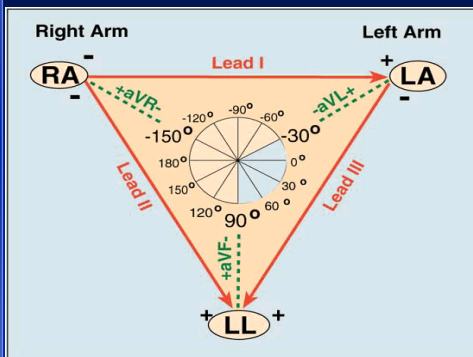


- SA node
- Intra-atrial pathways
- AV node
- Bundle of His
- Left and Right bundle branches
 - left anterior fascicle
 - left posterior fascicle
- Purkinje fibers

The 12 Lead ECG Device

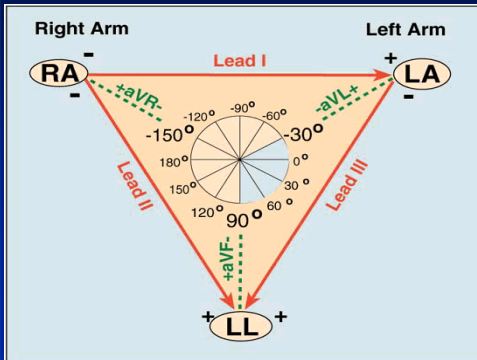
- Device serves as a voltmeter
 - measures the flow of electricity
- Unipolar vs Bipolar Leads

Bipolar Leads



- 1 positive and 1 negative electrode
 - RA always negative
 - LL always positive
- Traditional limb leads are examples of these
 - Lead I
 - Lead II
 - Lead III
- View from a vertical plane

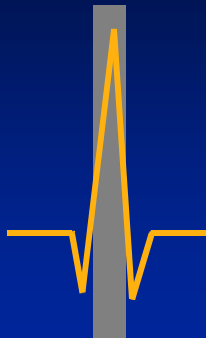
Unipolar Leads



- 1 positive electrode & 1 negative “reference point”
 - calculated by using summation of 2 negative leads
- Augmented Limb Leads
 - aVR, aVL, aVF
 - view from a vertical plane
- Precordial or Chest Leads
 - V1-V6
 - view from a horizontal plane

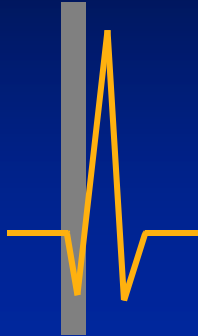
Waveform Components: R Wave

First positive deflection; R wave includes the downstroke returning to the baseline



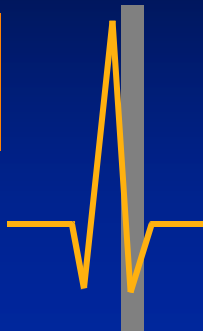
Waveform Components: Q Wave

■
First negative deflection
before R wave; Q wave
includes the negative
downstroke & return to
baseline



Waveform Components: S Wave

■
Negative deflection
following the R wave; S
wave includes departure
from & return to baseline

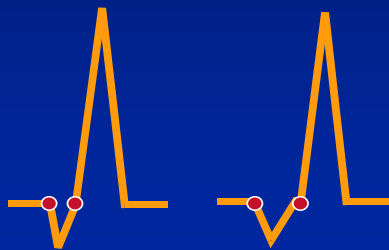


Waveform Components: QRS

- Q waves
 - Can occur normally in several leads
 - Normal Q waves called physiologic
 - Physiologic Q waves
 - $< .04$ sec (40ms)
 - Pathologic Q
 - $\geq .04$ sec (40 ms)

Waveform Components: QRS

- Q wave
 - Measure width
 - Pathologic if greater than or equal to 0.04 seconds (1 small box)



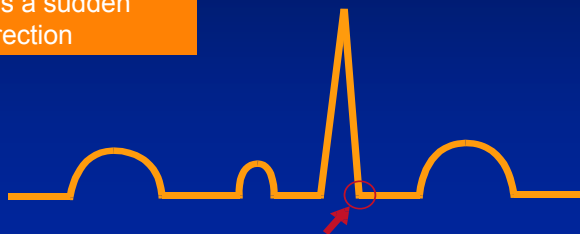
Waveform Components: QS Complex

Entire complex is
negatively deflected;
No R wave present



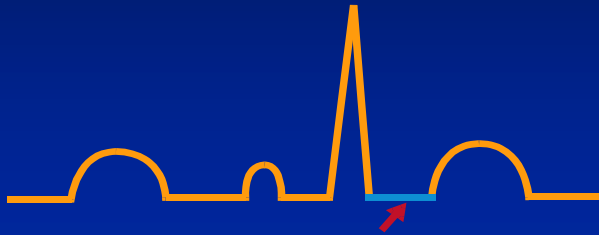
Waveform Components: J-Point

Junction between end of QRS and
beginning of ST segment; Where
QRS stops & makes a sudden
sharp change of direction



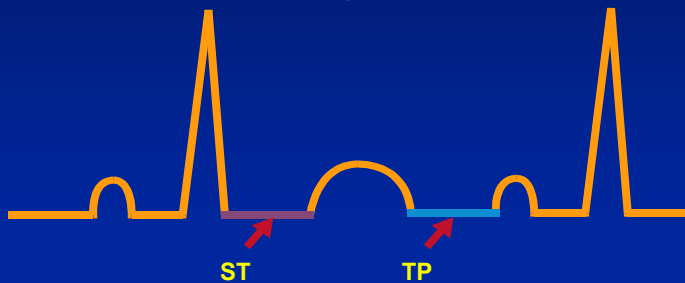
Waveform Components: ST Segment

Segment between J-point
and beginning of T wave



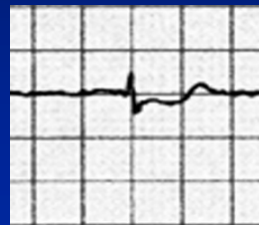
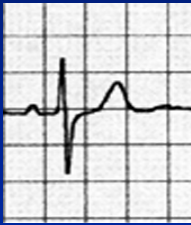
Waveform Components: ST Segment

- Need reference point
 - Compare to TP segment
 - DO NOT use PR segment as reference!



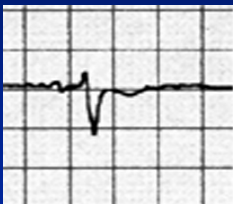
Waveform Components: Practice

- Find J-points and ST segments

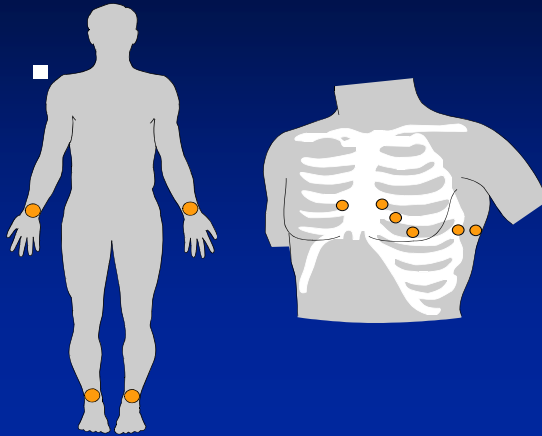


Waveform Components: Practice

- Find J-points and ST segments



Lead “Views”



Lead Groups

I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6

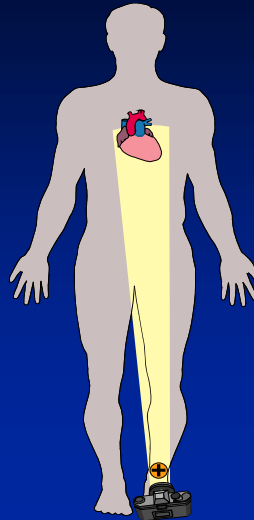
Limb Leads

Chest Leads

Inferior Wall

- II, III, aVF
 - View from Left Leg ⊕
 - inferior wall of left ventricle

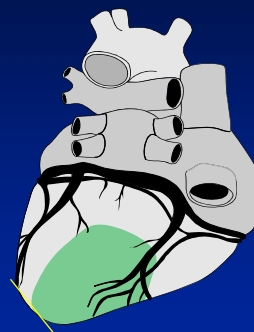
I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6



Inferior Wall

- Posterior View
 - portion resting on diaphragm
 - ST elevation □ suspect inferior injury

I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6

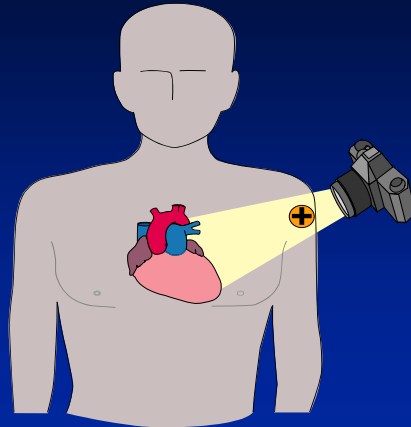


Inferior Wall

Lateral Wall

- I and aVL
 - View from Left Arm ⊕
 - lateral wall of left ventricle

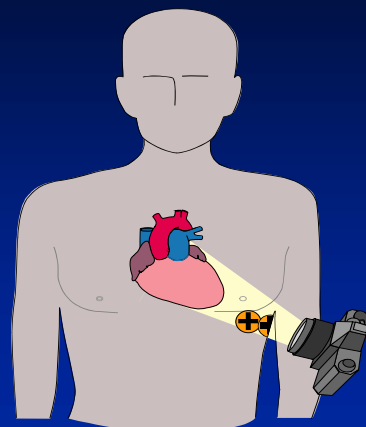
I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6



Lateral Wall

- V5 and V6
 - Left lateral chest
 - lateral wall of left ventricle

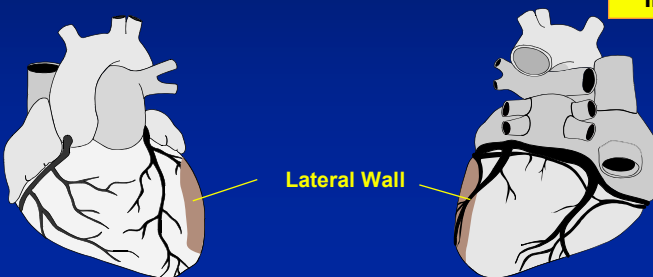
I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6



Lateral Wall

- I, aVL, V5, V6
 - ST elevation □ suspect lateral wall injury

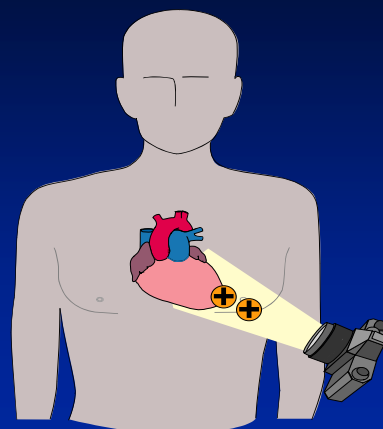
I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6



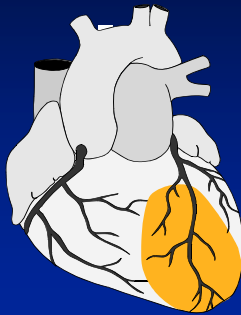
Anterior Wall

- V3, V4
 - Left anterior chest
 - ⊕ electrode on anterior chest

I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6



Anterior Wall



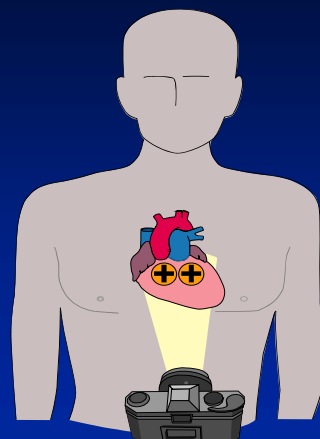
- V3, V4
 - ST segment elevation
 - suspect anterior wall injury

I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6

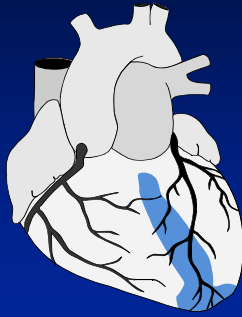
Septal Wall

- V1, V2
 - Along sternal borders
 - Look through right ventricle & see septal wall

I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6



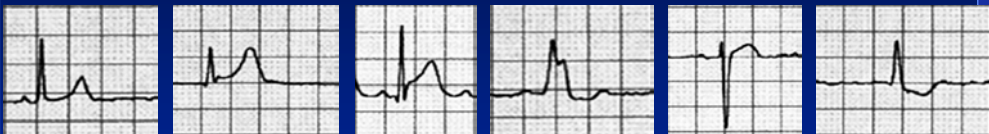
Septal



- V1, V2
 - septum is left ventricular tissue

I	aVR	V1	V4
II	aVL	V2	V5
III	aVF	V3	V6

ST Segment Analysis



For each complex, determine whether the ST segment is elevated one millimeter or more above the TP segment

12-Lead ECG

- AMI recognition
 - Two things to know
 - What to look for
 - Where you are looking

AMI Recognition

- What to look for
 - ST segment elevation
 - One millimeter or more (one small box)
 - Present in two anatomically contiguous leads